

Rhode Island Infant Mortality 1990-1999:

Changes in Causes of Death and
Period of Death by Insurance Status

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Infant Mortality: An Important Health Indicator

Infant mortality is defined as deaths in the first year of life. This rate is used universally as an indicator of the quality and accessibility of a population's health system.¹ The infant mortality rate is an important measure of the well being of infants, children and pregnant women because it is associated with maternal health, quality and access of prenatal and pediatric health care, socioeconomic conditions and public health practices.^{2, 3} Neonatal mortality (the period of death before 28 days of life) is a measure of access to prenatal and perinatal care, while postneonatal mortality (the period of death from 28 days to 1 year) is a measure of access to pediatric health care.⁴

The purpose of this evaluation report is to analyze trends and causes of infant mortality during the 1990's by insurance status. The 1990's were a time of significant health policy change and delivery system improvement through expansion in insurance coverage for low income and uninsured families through RItE Start and RItE Care. These programs were implemented in the last decade to improve the quality of and access to care for pregnant women, children and their families.

¹ Rohrer J. Planning of Community Oriented Health Systems. Baltimore: America Public Health Association, 1996. p. 93

² Federal Interagency Forum on Child and Family Statistics: America's Children: Key National Indicators for Well Being, 2000. Federal Interagency Forum on Child and Family Statistics, Washington DC, US Government Printing Office. July 2000.

³ Institute of Medicine (IOM). Access of Health Care in America. Washington DC: National Academy of Sciences. 1993. p. 56-57

⁴ Centers for Disease Control (CDC) "Postneonatal Mortality Surveillance – US 1980-1994" Morbidity and Mortality Weekly Report (MMWR) (47):15, 1998.

Data Sources/Methods

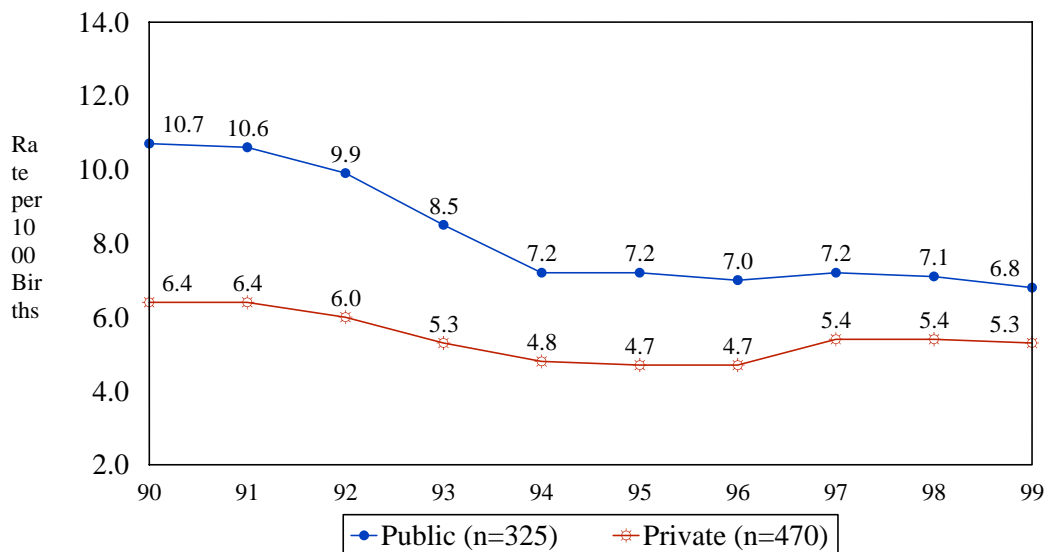
The data set used for this analysis was the linked death/birth file provided to the Center of Child and Family Health, Department of Human Services by the Division of Family Health, Department of Health. The data set contained the 905 infant deaths and 144,352 births that occurred to Rhode Island residents from 1990-1999. A SAS data set was created from the two files. Deaths were analyzed by year, mother's age, race, education, entry into care, mother's insurance status, cause of death and period of death. (see Appendix 1 for data table). Underlying and immediate cause of death were assigned after individual review of causes of death listed, ICD9 vital statistics file, and birth certificates for all 905 cases.

Mother's insurance status is self-reported after birth in the hospital on the birth worksheet. For this study infant's insurance status is assumed to be the same as mother's insurance status at the time of birth. During the 1990's the public insurance category on the birth certificate includes Medical Assistance, Medicaid, RItE Start and RItE Care. The private health insurance category includes Blue Cross, United, Harvard and other private insurance.

Trends in Infant Mortality 1990-1999 by Insurance Status

During the 1990's the overall infant mortality in Rhode Island declined 20% from 8.2 infant deaths per 1,000 births to 6.5 infant deaths per 1,000 births. Figure 1 shows the differences in infant mortality rates between infants with public coverage and infants with private coverage. From 1990 to 1999 the infant mortality rate declined 36% for infants with public coverage, from 10.7 deaths per 1,000 to 6.8 deaths per 1,000.

Figure 1
Rhode Island Infant Mortality by Insurance Status
1990-1999



Data Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services
Linked Birth Death File 1990-99, Division of Family Health, Department of Health (n=905)
Deaths per 1000 births to Infants 0-364 days - 3 year moving average

From 1988 to 1994 the RItE Start program, which provided comprehensive insurance coverage for uninsured pregnant women, was operating. Beginning in 1989, the Medicaid program also expanded coverage to uninsured pregnant women and also provided coverage to their infants. Beginning in 1994, all pregnant women

and their infants covered by either RItE Start or Medicaid were enrolled in RItE Care, Rhode Island's new Medicaid managed care program, which provided coverage through enrollment in a Health Plan or HMO.

The steep decline in infant mortality during the first half of the 1990's for infants born to publicly insured women reflects the time period of these expansions of publicly funded insurance programs. Even though the public rate is higher than the private rate, the gap is closing. The gap between the public and private rate was cut over half from 4.3 points in 1990 to 1.5 points in 1999.

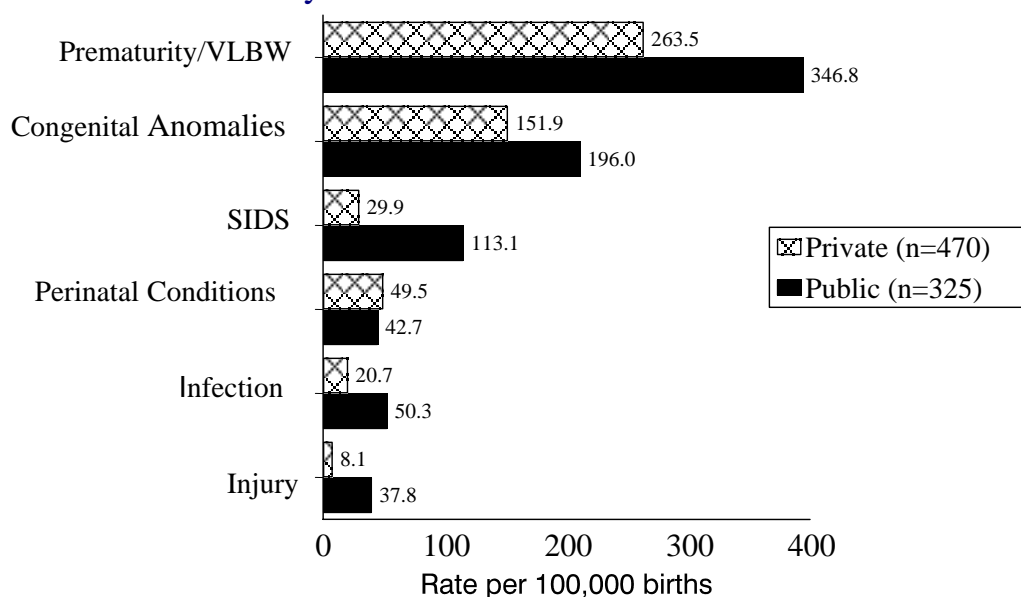
Underlying Causes of Death by Insurance Status

The six leading causes of infant death among Rhode Island infants are:

- Prematurity/very low birthweight (VLBW)
- Congenital anomalies
- Sudden infant death syndrome (SIDS)
- Perinatal Conditions
- Infection
- Injury

Prematurity/VLBW is the underlying cause of death for almost half the infant deaths for both insurance groups. Figure 2 shows that the infant mortality rate is on average 1.5 times higher for infants with public coverage for every cause of death. Death rates due to SIDS, injury, and infection are higher than this average. The injury death rate for infants with public coverage is five times higher than infants on private coverage. The infant death rate for SIDS is four times higher for infants with public coverage than infants with private coverage.

Figure 2: Rates of Underlying Causes of Infant Death by Insurance Status 1990-1999

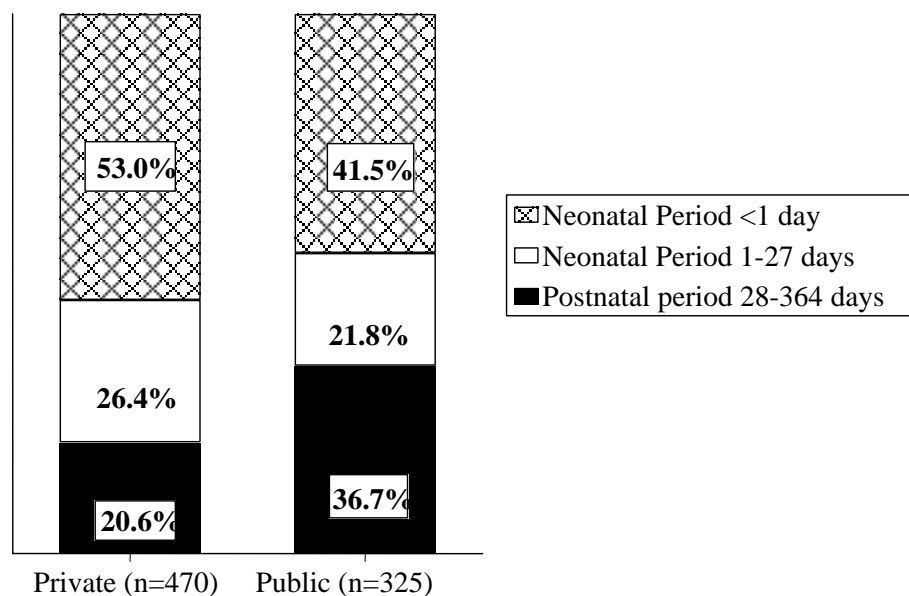


Data Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services
Linked Birth and Death File 1990-99, Division of Family Health, Department of Health (n=905)

Changes in Neonatal and Postneonatal Death Rates by Insurance Status

The distribution of period of infant death (i.e., neonatal or postneonatal) is also different between infants with public insurance and infants with private insurance. Figure 3 shows that the distribution of infants with private insurance who die on the first day of life is higher than infants with public insurance. For infants who die in the first year of life, fifty three percent (53%) of infants with private insurance die on the first day compared to 41.5% of infants with public insurance. A higher proportion of infants with public coverage die in the postneonatal period than privately insured infants. Thirty-seven percent (36.7%) of infants with public coverage die from 28-364 days of life compared to only 20.6% of infants with private coverage.

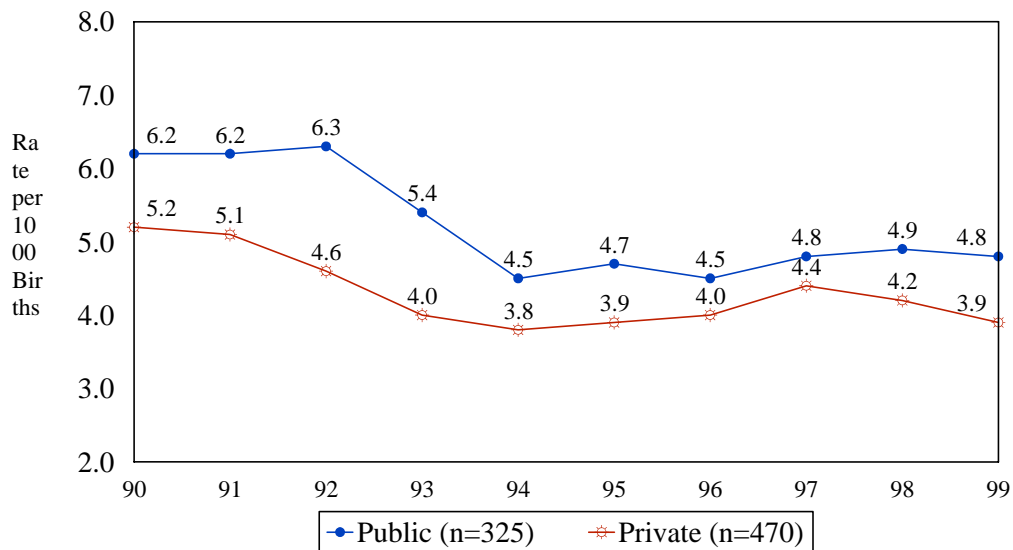
Figure 3
Distribution of Infant Deaths by Period of Death and Insurance Status 1990-1999



Data Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services
Linked Birth Death File 1990-99, Division of Family Health, Department of Health (n=905)

Both neonatal and postneonatal mortality declined from 1990-1999. Neonatal mortality, which is a measure of access to prenatal and perinatal care, declined for both infants with public insurance and infants with private insurance. Figure 4 shows that from 1990 to 1999 the neonatal mortality for infants with public coverage decreased 23% from 6.2 deaths per thousand to 4.8 deaths per thousand. The neonatal mortality for infants with private coverage declined 25% during this period from 5.2 to 3.9.

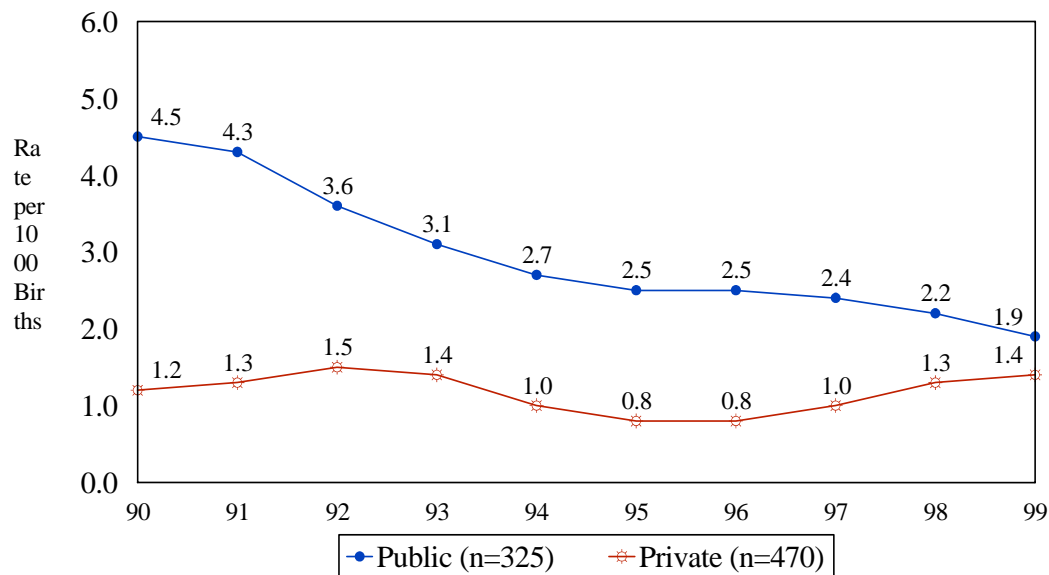
Figure 4
Rhode Island Neonatal Mortality by Insurance Status
1990-1999



Data Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services (n=905)
Linked Birth Death File 1990-99, Division of Family Health, Department of Health
Deaths per 1000 births to Infants 0-27 days - 3 year moving average

Figure 5 shows the sharp reduction in postneonatal mortality for infants with public coverage with the early nineties showing the steepest decline. Postneonatal mortality is a measure of access to pediatric care and socioeconomic status.⁵ In 1990 the postneonatal death rate for infants with public coverage was 4.5. By 1999 this rate had dropped to 1.9, which was a 57% reduction. During this same time period there was a 17% increase in the postneonatal death rate for privately insured infants. This increase in deaths may be due to the higher rate of multiple births among women with private insurance.

Figure 5
Rhode Island Postneonatal Mortality
by Insurance Status 1990-1999



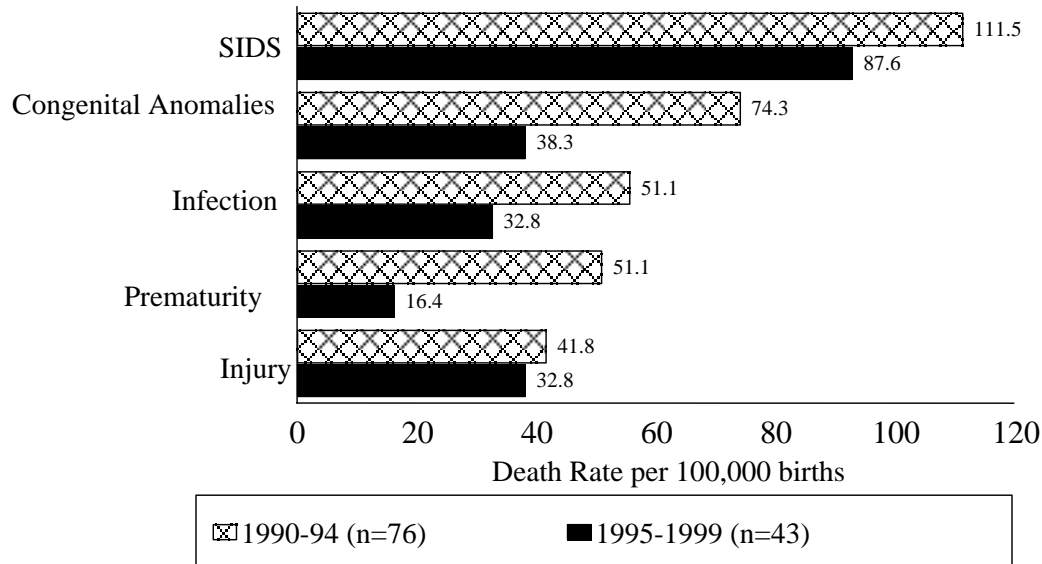
Date Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services (n=905)
Linked Birth Death File 1990-99, Division of Family Health, Department of Health
Deaths per 1000 births to Infants 28-364 days - 3 year moving average

⁵ Centers for Disease Control (CDC) "Postneonatal Mortality Surveillance – US 1980-1994" Morbidity and Mortality Weekly Report (MMWR) (47):15, 1998.

Reductions in Postneonatal Deaths During the 1990s for Infants with Public coverage

The reduction in the postneonatal mortality rate for infants with public coverage was seen across all causes of death. Figure 6 shows the infant mortality rates decreased from the early 1990s (1990-1994) to the late 1990s (1995-1999), SIDS, infection, and injury are considered preventable causes of postneonatal mortality.⁶ These preventable causes all declined during this period as well as deaths due to congenital anomalies and prematurity. This reduction represents better access to pediatric care for infants on public coverage in the first year of life, and intensive follow up of high risk, medically fragile infants.

Figure 6
Changes in Rates of Underlying Causes of Postneonatal Deaths*
for Infants with Public Insurance 1990-1999



Data Source: Medicaid Research and Evaluation Project
Center for Child and Family Health, Department of Human Services
Linked Birth Death File 1990-1999, Division of Family Health, Department of Health (n=905)
*Postneonatal deaths (28-364 days)

⁶ Centers for Disease Control (CDC) "Postneonatal Mortality Surveillance – US 1980-1994" Morbidity and Mortality Weekly Report (MMWR) (47):15, 1998.

Policy Implications

In Rhode Island the 1990's were a time of significant health policy change and delivery system improvement through expansions in publicly funded insurance coverage for low income and uninsured families through both RItE Start and RItE Care, and through improvements in access and quality through enrollment in health plans through RItE Care. Through these expansions of coverage and enrollment in health insurance, Rhode Island has achieved the lowest uninsurance rate in the country at 6.2%.⁷ The ultimate goal of these publicly funded health insurance programs is not to reduce uninsurance status alone. Insurance is the vehicle to improve access to care, improve quality of care, and improve health status and outcomes.

Evaluations of the RItE Care program have shown that RItE Care has improved access to both prenatal and pediatric care even after adjustment for differences in the characteristics of the population.^{8,9} This report provides evidence that the combination of publicly funded expansions of insurance, and improvements in access to care through enrollment in Health Plans not only reduces uninsurance rates, but is associated with an improvement in infant outcomes and status.

⁷ Current Population Survey, US Bureau of Census, September 2001.

^{8,9} Griffin J, Hogan J, Vivier P, Leddy T "The Effect of Medicaid Managed Care on Access to Pediatric Care for Inner City Infants (Unpublished manuscript 2001)

Griffin J, Hogan J, Buechner J, Leddy T "The Effect of a Medicaid Managed Care Program on the Adequacy of Prenatal Care Utilization in Rhode Island" American Journal of Public Health, 1999;89:497-507

Appendix 1: Rhode Island Infant Mortality Rates by Insurance Status and Period of Death 1990-1999										
Actual rates and 3yr averages										
Year	Private coverage					Public				
	TOTAL					TOTAL				
	#Births	#Deaths	Rate	3yravg		#Births	#Deaths	Rate	3yravg	
90	10328	64	6.2	6.4		3954	41	10.4	10.7	
91	9758	65	6.7	6.4		4175	47	11.3	10.6	
92	9291	55	5.9	6.0		4492	42	9.3	9.9	
93	8605	49	5.7	5.3		4598	45	9.8	8.5	
94	8440	34	4.0	4.8		4305	21	4.9	7.2	
95	8209	45	5.5	4.7		3510	33	9.4	7.2	
96	7962	30	3.8	4.7		3971	21	5.3	7.0	
97	8049	48	6.0	5.4		3619	29	8.0	7.2	
98	8208	49	6.0	5.4		3618	27	7.5	7.1	
99	8042	31	3.9	5.3		3554	19	5.3	6.8	
	86892	470	5.4			39796	325	8.2		
	Neonatal ¹					Neonatal				
90	10328	52	5.0	5.2		3954	25	6.3	6.2	
91	9758	54	5.5	5.1		4175	25	6.0	6.2	
92	9291	40	4.3	4.6		4492	30	6.7	6.3	
93	8605	36	4.2	4.0		4598	27	5.9	5.4	
94	8440	27	3.2	3.8		4305	13	3.0	4.5	
95	8209	39	4.8	3.9		3510	22	6.3	4.7	
96	7962	24	3.0	4.0		3971	13	3.3	4.5	
97	8049	41	5.1	4.4		3619	19	5.3	4.8	
98	8208	35	4.3	4.2		3618	20	5.5	4.9	
99	8042	25	3.1	3.9		3554	12	3.4	4.8	
	86892	373	4.3			39796	206	5.2		
	Postneonatal ²					Postneonatal				
90	10328	12	1.2	1.2		3954	16	4.0	4.5	
91	9758	11	1.1	1.3		4175	22	5.3	4.3	
92	9291	15	1.6	1.5		4492	12	2.7	3.6	
93	8605	13	1.5	1.4		4598	18	3.9	3.1	
94	8440	7	0.8	1.0		4305	8	1.9	2.7	
95	8209	6	0.7	0.8		3510	11	3.1	2.5	
96	7962	6	0.8	0.8		3971	8	2.0	2.5	
97	8049	7	0.9	1.0		3619	10	2.8	2.4	
98	8208	14	1.7	1.3		3618	7	1.9	2.2	
99	8042	6	0.7	1.4		3554	7	2.0	1.9	
	86892	97	1.1			39796	119	3.0		
Neonatal Deaths ¹ - 0-27 days							Postneonatal Deaths ² - 28-364 days			
Data Source: Medicaid Research and Evaluation project, Center for Child and Family health, RI Department of Human Services										
	Vital Statistics - Linked Birth/Death File, Division of Family Health, RI Department of Health									

